Conduit-scale to localized degassing in ascending magmas: Insights from Cl measurements in Vesuvius 79AD pumice

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During the ascent and decompression of magmas that fed the 79AD eruption, melts experienced a complex vesiculation history [1]. Both textural evidence from tephra and conduit ascent modelling suggest that velocity gradients affect the ascending magma column and cause spatial variations in degassing [2]. Localized shearing is one of the dominant mechanism through which these velocity gradients can be accommodated during ascent [3]. These shear zones can enhance bubble connectivity and provide pathways for volcanic gases. Here, we present chemical evidence for spatial degassing variations at the scale of the conduit as well as at localized scale. Because Cl diffuses slower than H_2O during ascent, it records a different portion of the magma's history. Figure 1 below shows Cl increases within denser more degassed zones in 79AD pumice clasts. Through textural observations of vesicles as well as Cl and H_2O measurements within pumice glass from various phases of the 79AD eruption, we derive a general conduit model that involves the birth, development, and death of shear-zones.

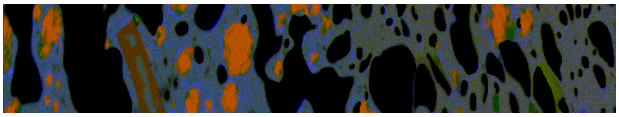

Figure 1: Compositional map (Cl=blue, K=red, Si=green) made in 79AD pumice. Cl increases towards the denser zone richer in large collapsed vesicles (left) likely due to degassing of H_2O. Image width ~ 0.5mm.

[1] Shea *et al*. (2010), *J. Volcanol. Geotherm. Res* **192**, 69-84. [2] Sable *et al*. (2006), *J. Volcanol. Geotherm. Res* **158**, 333-354. [3] Wright *et al*. (2009), *Geology* **37**, 1023-1026.

Soil source contribution estimation mation of Arsenic and Lead in atmospheric precipitaion at urban industrial area, Raipur, Central India

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The components and quantities of atmospheric dust fallout have been reported to be the pollution indicator of large urban areas. The multiplicity and complexity of sources of atmospheric dusts in urban regions has put forward the need of source apportionment of these sources indicating their contribution to specific environmental receptor. The study presented here is focused on investigation of soil source contribution estimates of Arsenic and lead in urban dust fallout in an urban-industrial area, Raipur, India. Source-receptor based representative sampling plan using longitudinal study design has been adopted. Source apportionment has been done using Chemical Mass Balance (CMB 8). Dominance of coal fired industries sources on arsenic levels measured at selected ambient residential receptors compared to line sources has been observed. Road-traffic has shown highest contribution of dust at indoor houses and out door-street automobile exhaust has shows highest contribution for arsenic. The results of CMB output and regression data of source-receptor dust matrices have shown comparable pattern.